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SEQUENCE LISTING
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<110> MEIJI SEIKA KAISHA, LTD.
WATANABE, Manabu
YANAI, Koji
TSUYUKI, Yumiko

<120> Surfactant tolerant cellulase and method for modification thereto

<130> Q95278

<150> PCT/JP2004/018184
<151> 2004-12-07

<150> JP 2003-409692
<151> 2003-12-08

<160> 48

<170> PatentIn version 3.1

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Cys Lys Pro Ser Cys Gly Trp Ala Lys Lys Ala Pro Val Asn Gln Pro
20 25 30

gtc ttc tcc tgc aac gcc aac ttc cag cgt ctc act gac ttc gac gcc 144
Val Phe Ser Cys Asn Ala Asn Phe Gln Arg Leu Thr Asp Phe Asp Ala
35 40 45

aag tcc ggc tgc gag ccg ggc ggt gtc gcc tac tcg tgc gcc gac cag 192
Lys Ser Gly Cys Glu Pro Gly Gly Val Ala Tyr Ser Cys Ala Asp Gln
50 55 60

acc cca tgg gct gtg aac gac gac ttc gcg ttc ggt ttt gct gcc acc 240

Thr Pro Trp Ala Val Asn Asp Asp Phe Ala Phe Gly Phe Ala Ala Thr			
65	70	75	80
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Ser Ile Ala Gly Ser Asn Glu Ala Gly Trp Cys Cys Ala Cys Tyr Glu			
85	90	95	
ctc acc ttc aca tcc ggt cct gtt gct ggc aag aag atg gtc gtc cag			336
Leu Thr Phe Thr Ser Gly Pro Val Ala Gly Lys Lys Met Val Val Gln			
100	105	110	
tcc acc agc act ggc ggt gat ctt ggc agc aac cac ttc gat ctc aac			384
Ser Thr Ser Thr Gly Gly Asp Leu Gly Ser Asn His Phe Asp Leu Asn			
115	120	125	
atc ccc ggc ggc ggc gtc ggc atc ttc gac gga tgc act ccc cag ttc			432
Ile Pro Gly Gly Val Gly Ile Phe Asp Gly Cys Thr Pro Gln Phe			
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ggc ggt ctg ccc ggc cag cgc tac ggc ggc atc tcg tcc cgc aac gag			480
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145	150	155	160
tgc gat cgg ttc ccc gac gcc ctc aag ccc ggc tgc tac tgg cgc ttc			528
Cys Asp Arg Phe Pro Asp Ala Leu Lys Pro Gly Cys Tyr Trp Arg Phe			
165	170	175	
gac tgg ttc aag aac gcc gac aac ccg agc ttc agc ttc cgt cag gtc			576
Asp Trp Phe Lys Asn Ala Asp Asn Pro Ser Phe Ser Phe Arg Gln Val			
180	185	190	
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195	200	205	
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225	230	235	240
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Ser Ser Pro Pro Val Gln Pro Thr Thr Pro Ser Gly Cys Thr Ala Glu			
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260	265	270	
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35 40 45

Lys Ser Gly Cys Glu Pro Gly Gly Val Ala Tyr Ser Cys Ala Asp Gln
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Thr Pro Trp Ala Val Asn Asp Asp Phe Ala Phe Gly Phe Ala Ala Thr
65 70 75 80

Ser Ile Ala Gly Ser Asn Glu Ala Gly Trp Cys Cys Ala Cys Tyr Glu
85 90 95

Leu Thr Phe Thr Ser Gly Pro Val Ala Gly Lys Lys Met Val Val Gln
100 105 110

Ser Thr Ser Thr Gly Gly Asp Leu Gly Ser Asn His Phe Asp Leu Asn
115 120 125

Ile Pro Gly Gly Val Gly Ile Phe Asp Gly Cys Thr Pro Gln Phe
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Gly Gly Leu Pro Gly Gln Arg Tyr Gly Gly Ile Ser Ser Arg Asn Glu
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165 170 175

Asp Trp Phe Lys Asn Ala Asp Asn Pro Ser Phe Ser Phe Arg Gln Val
180 185 190

Gln Cys Pro Ala Glu Leu Val Ala Arg Thr Gly Cys Arg Arg Asn Asp
195 200 205

Asp Gly Asn Phe Pro Ala Val Gln Ile Pro Ser Ser Ser Thr Ser Ser
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225 230 235 240

Ser Ser Pro Pro Val Gln Pro Thr Thr Pro Ser Gly Cys Thr Ala Glu
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ggc ggc aac gag gcc tcg tgg tgc tgt ggc tgc tac gag ctg acc ttc			288
Gly Gly Asn Glu Ala Ser Trp Cys Cys Gly Cys Tyr Glu Leu Thr Phe			
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acc tcg ggc ccc gtc gct ggc aag acc atg gtt gtc cag tcc acc tcg			336
Thr Ser Gly Pro Val Ala Gly Lys Thr Met Val Val Gln Ser Thr Ser			
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acc ggc ggc gac ctc ggc acc aac cac ttc gac ctg gcc atg ccc ggt			384
Thr Gly Gly Asp Leu Gly Thr Asn His Phe Asp Leu Ala Met Pro Gly			
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ggt ggt gtc ggc atc ttc gac ggc tgc tcg ccc cag ttc ggc ggc ctc			432
Gly Gly Val Gly Ile Phe Asp Gly Cys Ser Pro Gln Phe Gly Gly Leu			
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tcc ccc gcc ctc aag ccc ggc tgc tac tgg cgc ttc gac tgg ttc			528
Phe Pro Ala Ala Leu Lys Pro Gly Cys Tyr Trp Arg Phe Asp Trp Phe			
165	170	175	
aag aac gcc gac aac ccg acc ttc acc ttc cgc cag gtc cag tgc ccg			576
Lys Asn Ala Asp Asn Pro Thr Phe Thr Phe Arg Gln Val Gln Cys Pro			
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tcg gag ctc gtc gcc cgc acc ggc tgc cgc cgc aac gac gac ggc aac			624
Ser Glu Leu Val Ala Arg Thr Gly Cys Arg Arg Asn Asp Asp Gly Asn			
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Phe Pro Val Phe Thr Pro Pro Ser Gly Gly Gln Ser Ser Ser Ser Ser			
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tcc tcc agc agc gcc aag ccc acc tcc acc tcc acc tcg acc acc tcc			720
Ser Ser Ser Ala Lys Pro Thr Ser Thr Ser Thr Ser Thr Ser Thr Ser			
225	230	235	240
acc aag gct acc tcc acc acc tcg acc gcc tcc agc cag acc tcg tcg			768
Thr Lys Ala Thr Ser Thr Ser Thr Ala Ser Ser Gln Thr Ser Ser			
245	250	255	
tcc acc ggc ggc tgc gcc cag cgc tgg gcg cag tgc ggc ggc			816
Ser Thr Gly Gly Cys Ala Ala Gln Arg Trp Ala Gln Cys Gly Gly			
260	265	270	
atc ggg ttc tcg ggc tgc acc acg tgc gtc agc ggc acc acc tgc aac			864

Ile Gly Phe Ser Gly Cys Thr Thr Cys Val Ser Gly Thr Thr Cys Asn
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35 40 45

Gly Cys Asp Gly Gly Ser Ala Tyr Ala Cys Ala Asp Gln Thr Pro Trp
50 55 60

Ala Val Asn Asp Asn Phe Ser Tyr Gly Phe Ala Ala Thr Ser Ile Ser
65 70 75 80

Gly Gly Asn Glu Ala Ser Trp Cys Cys Gly Cys Tyr Glu Leu Thr Phe
85 90 95

Thr Ser Gly Pro Val Ala Gly Lys Thr Met Val Val Gln Ser Thr Ser
100 105 110

Thr Gly Gly Asp Leu Gly Thr Asn His Phe Asp Leu Ala Met Pro Gly
115 120 125

Gly Gly Val Gly Ile Phe Asp Gly Cys Ser Pro Gln Phe Gly Leu
130 135 140

Ala Gly Asp Arg Tyr Gly Gly Val Ser Ser Arg Ser Gln Cys Asp Ser
145 150 155 160

Phe Pro Ala Ala Leu Lys Pro Gly Cys Tyr Trp Arg Phe Asp Trp Phe
165 170 175

Lys Asn Ala Asp Asn Pro Thr Phe Thr Phe Arg Gln Val Gln Cys Pro
180 185 190

Ser Glu Leu Val Ala Arg Thr Gly Cys Arg Arg Asn Asp Asp Gly Asn
195 200 205

Phe Pro Val Phe Thr Pro Pro Ser Gly Gly Gln Ser Ser Ser Ser Ser
210 215 220

Ser Ser Ser Ser Ala Lys Pro Thr Ser Thr Ser Thr Ser Thr Ser Ser
225 230 235 240

Thr Lys Ala Thr Ser Thr Ser Thr Ala Ser Ser Gln Thr Ser Ser
245 250 255

Ser Thr Gly Gly Cys Ala Ala Gln Arg Trp Ala Gln Cys Gly Gly
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gac ggc ggc tcc gcc tac gcc tgc gac cag acc ccc tgg gcc gtc Asp Gly Gly Ser Ala Tyr Ala Cys Ala Asp Gln Thr Pro Trp Ala Val 50 55 60	252
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cccccccac ccccggttcg gtcccttgcc gtgccttctt catactaacc gcctacccc	413
tccagg ctg acc ttc acc tcg ggc ccc gtc gct ggc aag acc atg gtt Leu Thr Phe Thr Ser Gly Pro Val Ala Gly Lys Thr Met Val 95 100	461
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ctg gcc atg ccc ggt ggt gtc ggc atc ttc gac ggc tgc tcg ccc Leu Ala Met Pro Gly Gly Val Gly Ile Phe Asp Gly Cys Ser Pro 125 130 135	557
cag ttc ggc ctc gcc ggc gac cgc tac ggc ggc gtc tcg tcg cgc Gln Phe Gly Gly Leu Ala Gly Asp Arg Tyr Gly Val Ser Ser Arg 140 145 150	605
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cgc ttc gac tgg ttc aag aac gcc gac aac ccg acc ttc acc ttc cgc Arg Phe Asp Trp Phe Lys Asn Ala Asp Asn Pro Thr Phe Thr Phe Arg 170 175 180	701
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tcc tcc tcg tct tcc tcc agc agc gcc aag ccc acc tcc acc tcc	845

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Thr Ser Thr Thr Ser Lys Ala Thr Ser Thr Thr Ser Thr Ala Ser		
235	240	245
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Ser Gln Thr Ser Ser Ser Thr Gly Gly Gly Cys Ala Ala Gln Arg Trp		
250	255	260
gcg cag tgc ggc ggc atc ggg ttc tcg ggc tgc acc acg tgc gtc agc		989
Ala Gln Cys Gly Gly Ile Gly Phe Ser Gly Cys Thr Thr Cys Val Ser		
265	270	275
ggc acc acc tgc aac aag cag aac gac tgg tac tcg cag tgc ctt tga		1037
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gccggcccagc aggcggtatc cctcaccacc gagagg		36
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<210> 24
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tgc tcg tgg ccc ggc aag gcc tcg gtg aac cag ccc gtc ttc gcc tgc Cys Ser Trp Pro Gly Lys Ala Ser Val Asn Gln Pro Val Phe Ala Cys	96
20 25 30	
agc gcc aac ttc cag cgc atc agc gac ccc aac gtc aag tcg ggc tgc Ser Ala Asn Phe Gln Arg Ile Ser Asp Pro Asn Val Lys Ser Gly Cys	144
35 40 45	
gac ggc ggc tcc gcc tac gcc tgc gac cag acc ccc tgg gcc gtc Asp Gly Ser Ala Tyr Ala Cys Ala Asp Gln Thr Pro Trp Ala Val	192
50 55 60	
aac gac aac ttc tcg tac ggc ttc gcc acg tcc atc tcg ggc ggc Asn Asp Asn Phe Ser Tyr Gly Phe Ala Ala Thr Ser Ile Ser Gly Gly	240
65 70 75 80	
aac gag gcc tcg tgg tgc tgt ggc tgc tac gag ctg acc ttc acc tcg Asn Glu Ala Ser Trp Cys Cys Gly Cys Tyr Glu Leu Thr Phe Thr Ser	288
85 90 95	
ggc ccc gtc gct ggc aag acc atg gtt gtc cag tcc acc tcg acc ggc Gly Pro Val Ala Gly Lys Thr Met Val Val Gln Ser Thr Ser Thr Gly	336
100 105 110	
ggc gac ctc ggc acc aac cac ttc gac ctg gcc atg ccc ggt ggt ggt Gly Asp Leu Gly Thr Asn His Phe Asp Leu Ala Met Pro Gly Gly Gly	384
115 120 125	
gtc ggc atc ttc gac ggc tgc tcg ccc cag ttc ggc ggc ctc gcc ggc Val Gly Ile Phe Asp Gly Cys Ser Pro Gln Phe Gly Gly Leu Ala Gly	432
130 135 140	
gac cgc tac ggc ggc gtc tcg cgc agc cag tgc gac tcg ttc ccc Asp Arg Tyr Gly Val Ser Ser Arg Ser Gln Cys Asp Ser Phe Pro	480
145 150 155 160	
gcc gcc ctc aag ccc ggc tgc tac tgg cgc ttc gac tgg ttc aag aac Ala Ala Leu Lys Pro Gly Cys Tyr Trp Arg Phe Asp Trp Phe Lys Asn	528
165 170 175	
gcc gac aac ccg acc ttc acc ttc cgc cag gtc cag tgc ccg tcg gag Ala Asp Asn Pro Thr Phe Thr Arg Gln Val Gln Cys Pro Ser Glu	576
180 185 190	
ctc gtc gcc cgc acc ggc tgc cgc aac gac gac ggc aac ttc ccc Leu Val Ala Arg Thr Gly Cys Arg Arg Asn Asp Asp Gly Asn Phe Pro	624
195 200 205	
gtc ttc acc cct ccc tcg ggc ggt cag tcc tcc tcg tct tcc tcc tcc Val Phe Thr Pro Pro Ser Gly Gly Gln Ser Ser Ser Ser Ser Ser Ser	672
210 215 220	
agc agc gcc aag ccc acc tcc acc tcc acc tcg acc acc tcc acc aag Ser Ser Ala Lys Pro Thr Ser Thr Ser Thr Ser Thr Ser Thr Lys	720
225 230 235 240	

gct acc tcc acc acc tcg acc gcc tcc agc cag acc tcg tcg tcc acc		768	
Ala Thr Ser Thr Ser Thr Ala Ser Ser Gln Thr Ser Ser Ser Thr			
245	250	255	
ggc ggc ggc tgc gcc gcc cag cgc tgg gcg cag tgc ggc ggc atc ggg		816	
Gly Gly Gly Cys Ala Ala Gln Arg Trp Ala Gln Cys Gly Gly Ile Gly			
260	265	270	
tcc tcg ggc tgc acc acg tgc gtc agc ggc acc acc tgc aac aag cag		864	
Phe Ser Gly Cys Thr Thr Cys Val Ser Gly Thr Thr Cys Asn Lys Gln			
275	280	285	
aac gac tgg tac tcg cag tgc ctt taa		891	
Asn Asp Trp Tyr Ser Gln Cys Leu			
290	295		
<210> 38			
<211> 296			
<212> PRT			
<213> <i>Staphylococcus coccosporum</i> IFO 31817			
<220>			
<221> misc_feature			
<222> (1)..(3)			
<223> Pyroglutamic acid			
<400> 38			
Gln Ala Asp Gly Lys Ser Thr Arg Tyr Trp Asp Cys Cys Lys Pro Ser			
1	5	10	15
Cys Ser Trp Pro Gly Lys Ala Ser Val Asn Gln Pro Val Phe Ala Cys			
20	25	30	
Ser Ala Asn Phe Gln Arg Ile Ser Asp Pro Asn Val Lys Ser Gly Cys			
35	40	45	
Asp Gly Gly Ser Ala Tyr Ala Cys Ala Asp Gln Thr Pro Trp Ala Val			
50	55	60	
Asn Asp Asn Phe Ser Tyr Gly Phe Ala Ala Thr Ser Ile Ser Gly Gly			
65	70	75	80
Asn Glu Ala Ser Trp Cys Cys Gly Cys Tyr Glu Leu Thr Phe Thr Ser			
85	90	95	
Gly Pro Val Ala Gly Lys Thr Met Val Val Gln Ser Thr Ser Thr Gly			
100	105	110	
Gly Asp Leu Gly Thr Asn His Phe Asp Leu Ala Met Pro Gly Gly Gly			
115	120	125	

Val Gly Ile Phe Asp Gly Cys Ser Pro Gln Phe Gly Gly Leu Ala Gly
130 135 140

Asp Arg Tyr Gly Gly Val Ser Ser Arg Ser Gln Cys Asp Ser Phe Pro
145 150 155 160

Ala Ala Leu Lys Pro Gly Cys Tyr Trp Arg Phe Asp Trp Phe Lys Asn
165 170 175

Ala Asp Asn Pro Thr Phe Thr Phe Arg Gln Val Gln Cys Pro Ser Glu
180 185 190

Leu Val Ala Arg Thr Gly Cys Arg Arg Asn Asp Asp Gly Asn Phe Pro
195 200 205

Val Phe Thr Pro Pro Ser Gly Gly Gln Ser Ser Ser Ser Ser Ser
210 215 220

Ser Ser Ala Lys Pro Thr Ser Thr Ser Thr Ser Thr Thr Ser Thr Lys
225 230 235 240

Ala Thr Ser Thr Ser Thr Ala Ser Ser Gln Thr Ser Ser Ser Thr
245 250 255

Gly Gly Gly Cys Ala Ala Gln Arg Trp Ala Gln Cys Gly Gly Ile Gly
260 265 270

Phe Ser Gly Cys Thr Thr Cys Val Ser Gly Thr Thr Cys Asn Lys Gln
275 280 285

Asn Asp Trp Tyr Ser Gln Cys Leu
290 295

<210> 39
<211> 900
<212> DNA
<213> *Staphylocotrichum coccosporum* IFO 31817

<220>
<221> CDS
<222> (1)...(900)

<220>
<221> source
<222> (13)...(900)
<223> Pyroglutamic acid

<220>
 <221> misc_feature
 <222> (1)..(3)
 <223> Pyroglutamic acid

<400>	39		
cag tcg gca tgc gcc gat ggc aag tcc acc cgc tac tgg gac tgc tgc			48
Gln Ser Ala Cys Ala Asp Gly Lys Ser Thr Arg Tyr Trp Asp Cys Cys			
1	5	10	15
aag cct tcg tgc tcg tgg ccc ggc aag gcc tcg gtg aac cag ccc gtc			96
Lys Pro Ser Cys Ser Trp Pro Gly Lys Ala Ser Val Asn Gln Pro Val			
20	25	30	
ttc gcc tgc agc gcc aac ttc cag cgc atc agc gac ccc aac gtc aag			144
Phe Ala Cys Ser Ala Asn Phe Gln Arg Ile Ser Asp Pro Asn Val Lys			
35	40	45	
tcg ggc tgc gac ggc ggc tcc gcc tac gac tgc gac cag acc ccc			192
Ser Gly Cys Asp Gly Gly Ser Ala Tyr Ala Cys Ala Asp Gln Thr Pro			
50	55	60	
tgg gcc gtc aac gac aac ttc tcg tac ggc ttc gcc gac acg tcc atc			240
Trp Ala Val Asn Asp Asn Phe Ser Tyr Gly Phe Ala Ala Thr Ser Ile			
65	70	75	80
tcg ggc ggc aac gag gcc tcg tgg tgc tgt ggc tgc tac gag ctg acc			288
Ser Gly Gly Asn Glu Ala Ser Trp Cys Cys Gly Cys Tyr Glu Leu Thr			
85	90	95	
ttc acc tcg ggc ccc gtc gct ggc aag acc atg gtt gtc cag tcc acc			336
Phe Thr Ser Gly Pro Val Ala Gly Lys Thr Met Val Val Gln Ser Thr			
100	105	110	
tcg acc ggc gac ctc ggc acc aac cac ttc gac ctg gcc atg ccc			384
Ser Thr Gly Gly Asp Leu Gly Thr Asn His Phe Asp Leu Ala Met Pro			
115	120	125	
ggg ggt ggt gtc ggc atc ttc gac ggc tgc tcg ccc cag ttc ggc ggc			432
Gly Gly Val Gly Ile Phe Asp Gly Cys Ser Pro Gln Phe Gly Gly			
130	135	140	
ctc gcc ggc gac cgc tac ggc ggc gtc tcg tcg cgc agc cag tgc gac			480
Leu Ala Gly Asp Arg Tyr Gly Gly Val Ser Ser Arg Ser Gln Cys Asp			
145	150	155	160
tcg ttc ccc gcc ctc aag ccc ggc tgc tac tgg cgc ttc gac tgg			528
Ser Phe Pro Ala Ala Leu Lys Pro Gly Cys Tyr Trp Arg Phe Asp Trp			
165	170	175	
ttc aag aac gcc gac aac ccg acc ttc acc ttc cgc cag gtc cag tgc			576
Phe Lys Asn Ala Asp Asn Pro Thr Phe Thr Phe Arg Gln Val Gln Cys			
180	185	190	
ccg tcg gag ctc gtc gcc cgc acc ggc tgc cgc cgc aac gac gac ggc			624
Pro Ser Glu Leu Val Ala Arg Thr Gly Cys Arg Arg Asn Asp Asp Gly			
195	200	205	

aac ttc ccc gtc ttc acc cct ccc tcg ggc ggt cag tcc tcc tcg tct		672	
Asn Phe Pro Val Phe Thr Pro Pro Ser Gly Gly Gln Ser Ser Ser Ser			
210	215	220	
tcc tcc tcc agc agc gcc aag ccc acc tcc acc tcc acc tcg acc acc		720	
Ser Ser Ser Ser Ala Lys Pro Thr Ser Thr Ser Thr Ser Thr Thr			
225	230	235	240
tcc acc aag gct acc tcc acc acc tcg acc gcc tcc agc cag acc tcg		768	
Ser Thr Lys Ala Thr Ser Thr Ser Thr Ala Ser Ser Gln Thr Ser			
245	250	255	
tcg tcc acc ggc ggc tgc gcc gcc cag cgc tgg gcg cag tgc ggc		816	
Ser Ser Thr Gly Gly Cys Ala Ala Gln Arg Trp Ala Gln Cys Gly			
260	265	270	
ggc atc ggg ttc tcg ggc tgc acc acg tgc gtc agc ggc acc acc tgc		864	
Gly Ile Gly Phe Ser Gly Cys Thr Thr Cys Val Ser Gly Thr Thr Cys			
275	280	285	
aac aag cag aac gac tgg tac tcg cag tgc ctt taa		900	
Asn Lys Gln Asn Asp Trp Tyr Ser Gln Cys Leu			
290	295		

<210> 40
 <211> 299
 <212> PRT
 <213> *Staphylocotrichum coccosporum* IFO 31817

 <220>
 <221> misc_feature
 <222> (1)..(3)
 <223> Pyroglutamic acid

 <400> 40

Gln Ser Ala Cys Ala Asp Gly Lys Ser Thr Arg Tyr Trp Asp Cys Cys
 1 5 10 15

Lys Pro Ser Cys Ser Trp Pro Gly Lys Ala Ser Val Asn Gln Pro Val
 20 25 30

Phe Ala Cys Ser Ala Asn Phe Gln Arg Ile Ser Asp Pro Asn Val Lys
 35 40 45

Ser Gly Cys Asp Gly Gly Ser Ala Tyr Ala Cys Ala Asp Gln Thr Pro
 50 55 60

Trp Ala Val Asn Asp Asn Phe Ser Tyr Gly Phe Ala Ala Thr Ser Ile
 65 70 75 80

Ser Gly Gly Asn Glu Ala Ser Trp Cys Cys Gly Cys Tyr Glu Leu Thr
 85 90 95

Phe Thr Ser Gly Pro Val Ala Gly Lys Thr Met Val Val Gln Ser Thr
100 105 110

Ser Thr Gly Gly Asp Leu Gly Thr Asn His Phe Asp Leu Ala Met Pro
115 120 125

Gly Gly Gly Val Gly Ile Phe Asp Gly Cys Ser Pro Gln Phe Gly Gly
130 135 140

Leu Ala Gly Asp Arg Tyr Gly Gly Val Ser Ser Arg Ser Gln Cys Asp
145 150 155 160

Ser Phe Pro Ala Ala Leu Lys Pro Gly Cys Tyr Trp Arg Phe Asp Trp
165 170 175

Phe Lys Asn Ala Asp Asn Pro Thr Phe Thr Phe Arg Gln Val Gln Cys
180 185 190

Pro Ser Glu Leu Val Ala Arg Thr Gly Cys Arg Arg Asn Asp Asp Gly
195 200 205

Asn Phe Pro Val Phe Thr Pro Pro Ser Gly Gly Gln Ser Ser Ser Ser
210 215 220

Ser Ser Ser Ser Ala Lys Pro Thr Ser Thr Ser Thr Ser Thr Thr
225 230 235 240

Ser Thr Lys Ala Thr Ser Thr Ser Thr Ala Ser Ser Gln Thr Ser
245 250 255

Ser Ser Thr Gly Gly Cys Ala Ala Gln Arg Trp Ala Gln Cys Gly
260 265 270

Gly Ile Gly Phe Ser Gly Cys Thr Thr Cys Val Ser Gly Thr Thr Cys
275 280 285

Asn Lys Gln Asn Asp Trp Tyr Ser Gln Cys Leu
290 295

<210> 41
<211> 8
<212> PRT
<213> *Staphylocotrichum coccosporum* IFO 31817
<220>

<221> MOD_RES
<222> (1)..(1)
<223> PYRROLIDONE CARBOXYLIC ACID

<220>
<221> MUTAGEN
<222> (1)..(1)

<400> 41

Gln Ala Asp Gly Lys Ser Thr Arg
1 5

<210> 42
<211> 11
<212> PRT
<213> Staphylotrichum coccosporum IFO 31817

<220>
<221> MOD_RES
<222> (1)..(1)
<223> PYRROLIDONE CARBOXYLIC ACID

<220>
<221> MUTAGEN
<222> (1)..(4)

<400> 42

Gln Ser Ala Cys Ala Asp Gly Lys Ser Thr Arg
1 5 10

<210> 43
<211> 21
<212> PRT
<213> Staphylotrichum coccosporum IFO 31817

<400> 43

Met Arg Ser Ser Pro Val Leu Arg Thr Ala Leu Ala Ala Ala Leu Pro
1 5 10 15

Leu Ala Ala Leu Ala
20

<210> 44
<211> 295
<212> PRT
<213> Staphylotrichum coccosporum IFO 31817

<400> 44

Ala Asp Gly Lys Ser Thr Arg Tyr Trp Asp Cys Cys Lys Pro Ser Cys
1 5 10 15

Ser Trp Pro Gly Lys Ala Ser Val Asn Gln Pro Val Phe Ala Cys Ser
20 25 30

Ala Asn Phe Gln Arg Ile Ser Asp Pro Asn Val Lys Ser Gly Cys Asp
35 40 45

Gly Gly Ser Ala Tyr Ala Cys Ala Asp Gln Thr Pro Trp Ala Val Asn
50 55 60

Asp Asn Phe Ser Tyr Gly Phe Ala Ala Thr Ser Ile Ser Gly Gly Asn
65 70 75 80

Glu Ala Ser Trp Cys Cys Gly Cys Tyr Glu Leu Thr Phe Thr Ser Gly
85 90 95

Pro Val Ala Gly Lys Thr Met Val Val Gln Ser Thr Ser Thr Gly Gly
100 105 110

Asp Leu Gly Thr Asn His Phe Asp Leu Ala Met Pro Gly Gly Gly Val
115 120 125

Gly Ile Phe Asp Gly Cys Ser Pro Gln Phe Gly Gly Leu Ala Gly Asp
130 135 140

Arg Tyr Gly Gly Val Ser Ser Arg Ser Gln Cys Asp Ser Phe Pro Ala
145 150 155 160

Ala Leu Lys Pro Gly Cys Tyr Trp Arg Phe Asp Trp Phe Lys Asn Ala
165 170 175

Asp Asn Pro Thr Phe Thr Phe Arg Gln Val Gln Cys Pro Ser Glu Leu
180 185 190

Val Ala Arg Thr Gly Cys Arg Arg Asn Asp Asp Gly Asn Phe Pro Val
195 200 205

Phe Thr Pro Pro Ser Gly Gly Gln Ser Ser Ser Ser Ser Ser Ser Ser
210 215 220

Ser Ala Lys Pro Thr Ser Thr Ser Thr Ser Thr Thr Lys Ala
225 230 235 240

Thr Ser Thr Ser Thr Ala Ser Ser Gln Thr Ser Ser Ser Thr Gly
245 250 255

Gly Gly Cys Ala Ala Gln Arg Trp Ala Gln Cys Gly Gly Ile Gly Phe
260 265 270

Ser Gly Cys Thr Thr Cys Val Ser Gly Thr Thr Cys Asn Lys Gln Asn
275 280 285

Asp Trp Tyr Ser Gln Cys Leu
290 295

<210> 45
<211> 20
<212> PRT
<213> Humicola insolens

<400> 45

Met Arg Ser Ser Pro Leu Leu Arg Ser Ala Val Val Ala Ala Leu Pro
1 5 10 15

Val Leu Ala Leu
20

<210> 46
<211> 286
<212> PRT
<213> Humicola insolens

<400> 46

Ala Ala Asp Gly Lys Ser Thr Arg Tyr Trp Asp Cys Cys Lys Pro Ser
1 5 10 15

Cys Gly Trp Ala Lys Lys Ala Pro Val Asn Gln Pro Val Phe Ser Cys
20 25 30

Asn Ala Asn Phe Gln Arg Leu Thr Asp Phe Asp Ala Lys Ser Gly Cys
35 40 45

Glu Pro Gly Gly Val Ala Tyr Ser Cys Ala Asp Gln Thr Pro Trp Ala
50 55 60

Val Asn Asp Asp Phe Ala Phe Gly Phe Ala Ala Thr Ser Ile Ala Gly
65 70 75 80

Ser Asn Glu Ala Gly Trp Cys Cys Ala Cys Tyr Glu Leu Thr Phe Thr
85 90 95

Ser Gly Pro Val Ala Gly Lys Lys Met Val Val Gln Ser Thr Ser Thr
100 105 110

Gly Gly Asp Leu Gly Ser Asn His Phe Asp Leu Asn Ile Pro Gly Gly
115 120 125

Gly Val Gly Ile Phe Asp Gly Cys Thr Pro Gln Phe Gly Gly Leu Pro
130 135 140

Gly Gln Arg Tyr Gly Gly Ile Ser Ser Arg Asn Glu Cys Asp Arg Phe
145 150 155 160

Pro Asp Ala Leu Lys Pro Gly Cys Tyr Trp Arg Phe Asp Trp Phe Lys
165 170 175

Asn Ala Asp Asn Pro Ser Phe Ser Phe Arg Gln Val Gln Cys Pro Ala
180 185 190

Glu Leu Val Ala Arg Thr Gly Cys Arg Arg Asn Asp Asp Gly Asn Phe
195 200 205

Pro Ala Val Gln Ile Pro Ser Ser Ser Thr Ser Ser Pro Val Gly Gln
210 215 220

Pro Thr Ser Thr Ser Thr Ser Thr Ser Thr Thr Ser Ser Pro Pro
225 230 235 240

Val Gln Pro Thr Thr Pro Ser Gly Cys Thr Ala Glu Arg Trp Ala Cys
245 250 255

Gln Cys Gly Gly Asn Gly Trp Ser Gly Cys Thr Thr Cys Val Ala Gly
260 265 270

Ser Thr Cys Thr Lys Ile Asn Asp Trp Tyr His Gln Cys Leu
275 280 285

<210> 47
<211> 17
<212> PRT
<213> Humicola insolens

<400> 47

Met Gln Leu Pro Leu Thr Thr Leu Leu Thr Leu Leu Pro Ala Leu Ala
1 5 10 15

Ala

<210> 48
<211> 206
<212> PRT
<213> Humicola insolens

<400> 48

Ala Gln Ser Gly Ser Gly Arg Thr Thr Arg Tyr Trp Asp Cys Cys Lys
1 5 10 15

Pro Ser Cys Ala Trp Pro Gly Lys Gly Pro Ala Pro Val Arg Thr Cys
20 25 30

Asp Arg Trp Asp Asn Pro Leu Phe Asp Gly Gly Asn Thr Arg Ser Gly
35 40 45

Cys Asp Ala Gly Gly Ala Tyr Met Cys Ser Asp Gln Ser Pro Trp
50 55 60

Ala Val Ser Asp Asp Leu Ala Tyr Gly Trp Ala Ala Val Asn Ile Ala
65 70 75 80

Gly Ser Asn Glu Arg Gln Trp Cys Cys Ala Cys Tyr Glu Leu Thr Phe
85 90 95

Thr Ser Gly Pro Val Ala Gly Lys Arg Met Ile Val Gln Ala Ser Asn
100 105 110

Thr Gly Gly Asp Leu Gly Asn Asn His Phe Asp Ile Ala Met Pro Gly
115 120 125

Gly Gly Val Gly Ile Phe Asn Ala Cys Thr Asp Gln Tyr Gly Ala Pro
130 135 140

Pro Asn Gly Trp Gly Gln Arg Tyr Gly Gly Ile Ser Gln Arg His Glu
145 150 155 160

Cys Asp Ala Phe Pro Glu Lys Leu Lys Pro Gly Cys Tyr Trp Arg Phe
165 170 175

Asp Trp Phe Leu Asn Ala Asp Asn Pro Ser Val Asn Trp Arg Gln Val
180 185 190

Ser Cys Pro Ala Glu Ile Val Ala Lys Ser Gly Cys Ser Arg
195 200 205